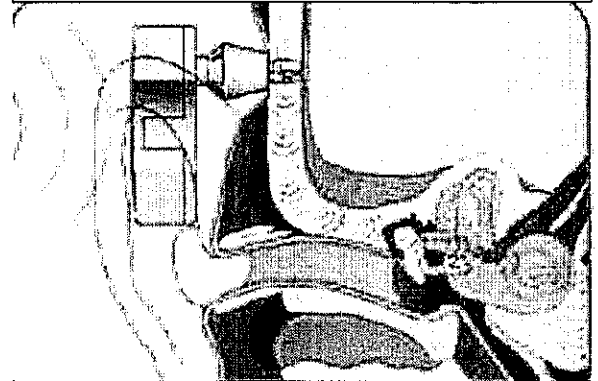


What is a Bone Anchored Hearing Aid (BAHA)?

The BAHA is a hearing aid that is attached to the skull via a titanium implant. The hearing aid transmits sound from the skull to a suitably capable residual inner ear, generally from either side of the skull (see Figure 1). The BAHA is designed to help two types of hearing impairment. Some people have a single ear that cannot hear because of inner ear or hearing nerve deafness. For others, a sound conducting system defect may not be able to be helped with a traditional hearing aid. Until the BAHA became available, headband bone conduction hearing aids or BiCROS hearing aids were the only options available.

Figure 1 Hearing aid, titanium screw in bone



What is the purpose?

BAHA instruments are applicable generally in two types of circumstances.

1. When one ear has hearing loss and an ear canal that is not usable for a traditional hearing aid, implanting the BAHA over and behind that ear can make that ear hearing useful. (see Figure 3)
2. When one ear is completely deaf, implanting a BAHA over that ear can relay sound through the skull to the opposite ear which allows the person to hear from the deaf side. While the BAHA in this circumstance does not restore the ability to tell the direction of sound, it does pick up sounds from the deaf side and makes it audible to the residual hearing ear to the degree that the residual ear is capable of hearing.

Figure 2 Screw with abutment behind left ear



Indications for the BAHA?

When the problem is unresolvable conductive hearing loss (hearing bone, mastoid, or ear canal problem), the ear is a candidate for the

BAHA if the ear is considered unsuitable for a conventional hearing aid that transmits sound directly through the ear canal. Recurring infection and anatomy unsuitable for hearing aid use are typical examples.

1. The bone conduction pure tones in the better ear must be equal to or better than 45 dB for 500 to 3000 Hertz.
2. The patient should be unable to wear a hearing aid in the deaf or poorer hearing ear.

Figure 3 BAHA in place



Alternatives to BAHA?

When the problem is that one inner ear is deaf or unsuitable for a hearing aid, the patient may consider a BiCROS or CROS hearing aid system or a transcranial hearing aid before selecting the BAHA. CROS is an acronym for *contra lateral routing of signal*. BiCROS is an acronym for *bilateral contra lateral routing of signal*. The CROS hearing aid is an instrument that routes sound from the poor hearing ear across the skull to the better hearing ear either by FM radio transmission (like a cordless phone) or by a wire that crosses through the hair. The CROS system appears to be a two-hearing aid system which places a microphone/transmitter in or over the poorer hearing ear and a receiver/speaker in the better hearing ear. The BiCROS system is like the CROS system, but also amplifies sound in the

better ear so that sound from both sides feeds to the better hearing ear. The transcranial hearing aid is an instrument that fits tightly into the deaf ear and broadcasts sound loudly enough to cross through the skull to the better hearing ear.

General Considerations:

In BAHA surgery, the goal is to thread a titanium screw into a suitable area of the skull (Figure 1). The scalp above and behind the ear is the most practical area. After a thumbnail sized incision, all soft tissue between the skin and the skull bone is removed. The hair follicles in an area about the size of a dime are removed (Figure 2). After drilling a hole into the bone, a tap carves a screw pattern into the bone. The screw is turned into the hole and the position is marked against the overlying skin. A tiny hole placed in the skin allows an external fastener to be affixed to the internal screw. The screw must heal in place **at least six to eight weeks** before the BAHA can be attached (Figure 3). It takes about three months for the titanium to become a fixed immovable part of the bone. For children, the healing period is up to **three months**. Feel free to ask the surgeon to demonstrate the surgery pathway on a plastic skull. Please feel free to ask the audiologist to demonstrate the device function on your teeth if your teeth are not false.

Before Surgery:

Avoid use of Advil, Motrin, Aleve, Celebrex, Vioxx, or similar non-steroidal anti-inflammatory medication for a minimum of five days and preferably two weeks before surgery. Ask the doctor if any other medications will need to be changed ahead of surgery.

After surgery, restrictions include:

Do not use aspirin, Advil, Motrin, Aleve, Celebrex, Vioxx, or similar non-steroidal anti-inflammatory medication for two weeks after surgery. These and other **arthritis medications may cause bleeding**.

A gauze dressing will be wrapped around the metal piece that protrudes through the skin. **Do not remove the head dressing or the gauze wrap until the doctor sees you at 4-6 days after surgery.** Once the dressing has been removed, the doctor will show you how to make a circular gauze to fit around the titanium implant. Then, put fresh antibiotic cream or ointment around the metal piece twice per day and then replace the healing cap. **Wait until 7-10 days after the surgery** to wash the hair and incision with soap and water. Rinse it well and continue to coat it with antibiotic ointment. **Permanent care** of the site where the metal comes through the skin will involve careful cleaning and drying. If any reaction appears around it, treat it with antibiotic ointment. If the ointment appears to cause a skin reaction, stop using it and contact the doctor.

Resuming normal activities:

You may resume all normal activities except hair washing the day after surgery unless you have a problem about which you are concerned. Then, call the doctor to discuss. **You may not wash your hair until a week after surgery per the instructions above in After Surgery, restrictions include...see paragraph above.**

Risks:

The titanium bone anchor in uncommon cases may dislodge or become infected necessitating removal or replacement to a new bone site. The skin may develop an allergic reaction to the ointment used around the metal material that comes through the skin. The inner ear hearing levels may decline to a degree that this particular type of hearing aid system will no longer be adequate.

Patient/Guardian Statement: The patient or patient's guardian and/or legal representative state by signing below that doctor has discussed the surgery, alternatives, and major risks, that the above information has been communicated to the patient, guardian, and/or legal representative and that an opportunity to ask questions has been given. The consent form should not be signed until the patient, guardian, and/or legal representative have obtained a layman's understanding of the surgery and have obtained satisfactory answers to all questions. By signing the consent form, the patient, guardian, and/or legal representative indicate a layman's understanding of the surgery, potential alternatives to surgery, and reasons for surgery and indicate a desire to proceed. If the surgery has been explained in another language, the person who has translated must indicate by cosigning the document that all information from the doctor and from this consent form have been communicated to the patient, guardian, and/or legal representative and that all questions have been answered satisfactorily.

Patient Printed Name			Patient/Guardian Signature			Date Signed
Circle Surgery Ear	R	L	Doctor: Loren J Bartels MD FACS		Date of Surgery	
Witness		Guardian Printed Name		Translator	Language	